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10/632,499	08/01/2003	Frank Olschewski	21295.59(H5644US)	4405

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EXAMINER	
ROSARIO, DENNIS	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/632,499	OLSCHEWSKI, FRANK	
	Examiner	Art Unit	
	DENNIS ROSARIO	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 August 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,10 and 11* is/are rejected.

7)☒ Claim(s) *9* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 August 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The amendment was received on 8/23/10. Claims 1-11 are pending.

Response to Arguments

2. Applicant's arguments, see remarks, page 6, 5th paragraph, last two sentences, filed 8/23/10, with respect to the rejection(s) of claim 1 under 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Szeliski (US Patent 5,611,000).

Applicant's arguments, see remarks, page 9, 2nd full paragraph, filed 8/23/10, with respect to the rejection(s) of claim 1 under 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Eng et al. (Motion Trajectory Extraction Based on Macroblock Motion Vectors for Video Indexing).

Applicant's arguments filed 8/23/10 have been fully considered but they are not persuasive:

Applicants state that Sezan does not teach comparing two chronologically successively acquired values detected for each pixel of the detector unit for each two chronologically successively acquired images. The examiner respectfully disagrees since Sezan teaches comparing ("compared" in col. 6, lines 4-9) two chronologically successively (corresponding to "three (temporally) successive fields" in col. 7, lines 26-29 as shown in fig. 5) acquired values ("pixel values" in col. 6, lines 4-9 from said fig. 5)

detected (via a camera that is broadly a detector meaning a sensing device such as the camera that is of the visible senses) for each pixel of the detector unit for each two chronologically successively acquired images.

Applicants state that Sezan does not teach comparing of the values for pixel of the detector unit. The examiner respectfully disagrees since Sezan teaches comparing ("compared" in col. 6, lines 4-9) of the values ("pixel values" in col. 6, lines 4-9 from said fig. 5) for pixel of the detector unit ("camera" in col. 4, lines 32,33 that is broadly a detector meaning a sensing device such as the camera that is of the visible senses).

Applicants state that Sezan has compression. See the 112, 1st paragraph rejection, below. Note that the claims are allowable over the cited art if the last limitation has support in the specification or originally presented claims since the cited art has compression.

Applicants suggest that Ma does not compare as claimed. The examiner agrees, but Sezan compares as claimed.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Claim 11 rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Regarding claim 11, the broadest reasonable interpretation of the claimed "computer-readable medium" consistent with the specification, the state-of-the-art, and a conclusion reached by one skilled in the art, is that the full scope covers non-statutory

"signal" embodiments. The specification is silent regarding the meaning of a "computer-readable medium". The state-of-the-art at the time the invention was made included signals, carrier waves and other wireless communication modalities (e.g., RF, infrared, etc.) as media on which executable code was recorded and from which computers acquired such code. Thus, the full scope of the claim covers "signals" and their equivalents, which are non-statutory per se. (*In re Nuijten*). The examiner suggests clarify the claim to exclude such non-statutory signal embodiments, such as (but not limited to) by reciting a "non-transitory computer-readable medium".

Claim Rejections - 35 USC § 112

5. Due to the amendment, the 112 rejection is withdrawn. However a new grounds of rejection under 35 USC 112 1st paragraph is below.

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 1-11 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding claim 1, last two lines recite the limitation, "not subjected to compression or decompression". This limitation is a recited in the "negative", defining the invention by virtue of what is isn't, vs. what it is. While there is nothing inherently

wrong with a negative limitation, it must be supported by the original disclosure in the same manner as a positive limitation. Just as with a positive limitation, "silence" does not constitute support for a limitation. Support for the limitation in question cannot be found in the specification or in the originally presented claims. That is, there is no indication that the invention does NOT utilize compression or decompression; or the invention is not open to compression or decompression. A preferred embodiment is just that, “preferred”, but not the only embodiment. The original claims did not exclude compression or decompression, and thus given that the original claims were open-ended, included compression and decompression. Refer to MPEP 2173.05(i). Claim 7 is rejected for the same reasons as claim 1.

Thus, remaining claims are rejected, too.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1,2,7,8 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sezan et al. (US Patent 5,682,205) in view of Ma (US Patent 7,072,398 B2) and Szeliski et al. (US Patent 5,611,000) and Eng et al. (Motion Trajectory Extraction Based on Macroblock Motion Vectors for Video Indexing) and Iu (US Patent 5,361,105).

Note that the claimed displacement vector field is considered by the examiner to have various synonyms, such as motion vector field, optical flow field and is considered as a set or group or collection of motion vectors, such as a block with vectors inside, that describes the motion between frames/images in regard to interpreting the prior art with the claims.

Regarding claim 1, Sezan teaches a method for optimizing the image quality of movable subjects imaged with a microscope system, comprising the following steps:

a) optically acquiring images (implied by "camera" in col. 4, lines 31,32 which would include structures such as a lens which corresponds to the claimed optically) by a detector unit (said camera that is broadly a detector meaning a sensing device such as the camera that is of the visible senses), each image having a plurality of pixels (indicated in fig. 2: "MISSING LINE OF PIXELS");

b) for each two chronologically successively acquired images (as shown in fig. 5 where E1 is an even field of one frame, O1 is an odd field of another frame, and E2 is an even field of a third frame) comparing ("compared" in col. 10, lines 9-15) two chronologically successively acquired values (from E1 and E2 are considered successive even though a frame of O1 is between them) detected for each pixel (intended use) of the detector unit (said camera) to determine a respective displacement vector field between the two chronologically successively acquired images (everything after and including "to determine" is intended use);

c) identifying a trajectory ("motion trajectory…i.e., the velocity" in col. 12, lines 48-51 and "assumed motion trajectory" in col. 13, lines 63-65) for each pixel

(intended use) of the acquired images (of said E1,O1 and E2) from (an assumption of trajectory) respective displacement vector fields (said E1 and E2 as shown in fig. 12C are not the source of the trajectory; thus, the trajectory is not from E1 and E2) determined for each two chronologically successively acquired images (thus this last portion of this limitation is not taught); and

d) applying an operation ("This operation" in col. 13, lines 63-65) to the images optically acquired by the detector unit along the identified trajectory (not taught since the assumed trajectory is not from the fields),

e) wherein the acquired images are not subjected to compression or decompression during the applying of the operation (Sezan teaches compression by using interlaced fields and does not meet this limitation; however, this limitation is not given much weight due to no support in the specification that positively recites this limitation).

Sezan does not teach

a) the microscope,

b) the trajectory comes from the displacement vector fields determined for each two chronologically successively acquired images, and

c) applying an operation to the images along the identified trajectory.

Szeliski teaches "microscopes" in col. 3, last line to col. 4, line 3 as one type of imaging amongst a plurality of types.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to exchange the camera of Sezan with the microscope of Szeliski to

obtain microscopic images. The determination of obviousness is predicated upon the following findings: One skilled in the art would have been motivated to modify Sezan in this manner because/in order to obtain images that show features that are hard to see with the eye as “understood” in col. 3, last line to col. 4, line 3 of Szeliski depending of a specific situations that would require a microscope instead of a camera. Furthermore, the prior art collectively includes each element claimed (though not all in the same reference), and one of ordinary skill in the art could have combined the elements in the manner explained above using known engineering design, interface and/or programming techniques, without changing a “fundamental” operating principle of Sezan, while the teaching of Szeliski continues to perform the same function as originally taught prior to being combined, in order to produce the repeatable and predictable result of providing images from a microscope as needed. It is for at least the aforementioned reasons that the examiner has reached a conclusion of obviousness with respect to the claim in question.

The combination does not teach

a) the trajectory comes from the displacement vector fields determined for each two chronologically successively acquired images, and

b) applying an operation to the images along the identified trajectory.

Ma teaches "Extracting Motion Trajectories" in col. 10, lines 41,42 using a vector field via "Motion-vector field denoising" in col. 10, lines 43-47. Thus, the extracted motion trajectories come from one vector field that corresponds to the claimed two displacement vector fields.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Sezan assumption of a trajectory between interlace fields to actually determined the trajectory between interlace fields in light of Ma's extraction of trajectories based on a motion vector field that corresponds to one of the claimed displacement vector fields. The determination of obviousness is predicated upon the following findings: One skilled in the art would have been motivated to modify Sezan in this manner because/in order to obtain a computed trajectory that is an “important key feature to digital video" in col. 3, lines 21-23 of Ma. Furthermore, the prior art collectively includes each element claimed (though not all in the same reference), and one of ordinary skill in the art could have combined the elements in the manner explained above using known engineering design, interface and/or programming techniques, without changing a “fundamental” operating principle of Sezan, while the teaching of Ma continues to perform the same function as originally taught prior to being combined, in order to produce the repeatable and predictable result of quantifying a trajectory. It is for at least the aforementioned reasons that the examiner has reached a conclusion of obviousness with respect to the claim in question.

Ma meets only a limitation portion of the claimed trajectory comes from the displacement vector fields determined for each two chronologically successively acquired images by teaching only one field that comes from one pair of images from which the motion vector field is generated. Thus, Ma does not clearly teach a second field generated from another image pair, but should be done given that Ma teaches video sequences that ought to have more than two images that describe a trajectory.

The combination does not teach

a) the trajectory comes from the displacement vector fields determined for each two chronologically successively acquired images, and

b) applying an operation to the images along the identified trajectory.

Eng teaches

a) the trajectory (fig. 3(a): "VO1's trajectory") from the displacement vector fields (implied by the trajectory comes from "100 frames" in the description of figure 3 and fig .1(a): "Original MV field" and "Repeating such process from frame to frame, the motion trajectories are established" in page 287, section 3, 1st paragraph, last sentence; thus, for each image pair of the 100 frames, 50 MV fields are created wherein each MV field is used to "link" each frame creating the trajectory of fig. 3(a)) determined for each two chronologically successively acquired images (implied by said 100 frames), and

b) applying an operation to the images along the identified trajectory (not taught).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to add another motion vector field of Ma to create a longer trajectory as taught in Eng. The determination of obviousness is predicated upon the following findings: One skilled in the art would have been motivated to modify Ma in this manner because/in order to effectively describe and understand "dynamic content of" (page 284, section 1, 1st paragraph, last sentence) a video sequence. Furthermore, the prior art collectively includes each element claimed (though not all in the same reference), and one of ordinary skill in the art could have combined the elements in the manner

explained above using known engineering design, interface and/or programming techniques, without changing a "fundamental" operating principle of Ma, while the teaching of Eng continues to perform the same function as originally taught prior to being combined, in order to produce the repeatable and predictable result of obtaining an effective description and understanding of dynamic video content. It is for at least the aforementioned reasons that the examiner has reached a conclusion of obviousness with respect to the claim in question.

The combination does not teach applying an operation to the images along the identified trajectory.

Iu teaches applying an operation (reducing noise) to the images (corresponding to fig. 14: "frame" shown three times) along the identified trajectory ("along a trajectory" in fig. 3, lines 39-41.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to filter the 100 frames of Eng along an identified trajectory of Eng as taught in Iu's fig. 14. The determination of obviousness is predicated upon the following findings: One skilled in the art would have been motivated to modify Eng in this manner because/in order to remove noise in an image sequence. Furthermore, the prior art collectively includes each element claimed (though not all in the same reference), and one of ordinary skill in the art could have combined the elements in the manner explained above using known engineering design, interface and/or programming techniques, without changing a "fundamental" operating principle of Eng, while the teaching of Iu continues to perform the same function as originally taught prior to being

combined, in order to produce the repeatable and predictable result of providing video frames with noise that has been removed along a trajectory. It is for at least the aforementioned reasons that the examiner has reached a conclusion of obviousness with respect to the claim in question.

Regarding claim 2, Iu teaches the method as defined in Claim 1, wherein the operation along the identified trajectory is a deconvolution, a smoothing, an averaging filter, or an operation (noise reducing) acting in time-lateral fashion (as shown in fig. 14 that has frames at different times).

Claim 7 is rejected the same as claim 1. Thus, argument presented in claim 1 is equally applicable to claim 7.

Claim 8 is rejected the same as claim 2. Thus, argument presented in claim 2 is equally applicable to claim 8.

Regarding claim 11, Sezan discloses a computer-usable software (or "image processing application software executable" in col. 8, lines 27-37) on a computer-readable medium (implied by the executable and "processor" ibid), wherein the software causes a microscope system to carry out a method as defined in one of Claims 1 through 6.

10. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sezan et al. (US Patent 5,682,205) in view of Ma (US Patent 7,072,398 B2) and Szeliski et al. (US Patent 5,611,000) and Eng et al. (Motion Trajectory Extraction Based on Macroblock Motion Vectors for Video Indexing) and Iu (US Patent 5,361,105), as

applied to claims 1,2,7,8 and 11 above, further in view of Dalziel et al. (US Patent 5,579,444).

Regarding claim 3, the combination teaches the method as defined in Claim 1, wherein

a) the images (said E1 and E2 of Sezan) optically acquired by the detector unit (said camera of Sezan as modified by Szeliski's microscope) are conveyed to an image memory (implied by "field stores" in col. 4, lines 53-58 of Sezan); and

b) data (fig. 12C:E1) obtained from the images optically acquired by the detector unit (said camera of Sezan as modified by Szeliski) is conveyed to an optical flow calculator to a trajectory tracker, and to a trajectory memory (E1 is not clearly conveyed to the optical flow calculator and trajectory tracker and trajectory memory).

Sezan of the combination does not teach data obtained from the images optically acquired by the detector unit (as modified by Szeliski) is conveyed to an optical flow calculator to a trajectory tracker, and to a trajectory memory.

Dalziel teaches

a) the images optically acquired by the detector unit (fig. 1:12 corresponds to a "microscope" in col. 30, lines 58-61) are conveyed to an image memory (fig. 19:85); and

b) data obtained from the images optically acquired by the detector unit (fig. 19:12) is conveyed to an optical flow calculator (implied by "OPTICAL FLOW AND TRACKING" section in column 23 and corresponding to fig. 3:72) to a trajectory tracker (fig. 3:73), and to a trajectory memory (implied by "elements to be tracked are stored in

the memory…so that the expected trajectory of these elements can be determined" in col. 24, lines 55-58).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to extract optical flow and trajectory data from the microscope of Szeliski in light of Dalziel's fig. 3 that includes a microscope system. The determination of obviousness is predicated upon the following findings: One skilled in the art would have been motivated to modify Szeliski in this manner because/in order to "achieve accurate manipulation of objects" in col. 1, lines 57-60 at "sub-micron accuracy" in col. 30, lines 53-58. Furthermore, the prior art collectively includes each element claimed (though not all in the same reference), and one of ordinary skill in the art could have combined the elements in the manner explained above using known engineering design, interface and/or programming techniques, without changing a "fundamental" operating principle of Szeliski, while the teaching of Dalziel continues to perform the same function as originally taught prior to being combined, in order to produce the repeatable and predictable result of manipulating objects at the sub-micron level. It is for at least the aforementioned reasons that the examiner has reached a conclusion of obviousness with respect to the claim in question.

Regarding claim 4, Dalziel teaches the method as defined in Claim 3, wherein for the application of the operation, the images (fig. 2:2-D LABELLED SEGMENTED IMAGES) optically acquired by the detector unit (fig. 2:12) are retrieved from the image memory (fig. 19:85 corresponds to fig. 2:12,14 and 16 and "local memory" in col. 14, lines 46-50) and corresponding trajectory data ("previous positions" in col. 24, lines 56-

59) is retrieved from the trajectory memory ("memory of the system" in col. 24, lines 56-59 and "system memory" in col. 33, lines 44-46) in a correlated way (implied since the previous positions from system memory are used to "increase efficiency of tracking" in col. 24, lines 56-59 that used images from the frame store).

Regarding claim 5, Iu teaches the method as defined in Claim 4, wherein the data generated (output of fig. 1:100) by application of the operation (noise reduction) is conveyed to a second image memory (fig. 1: FIFO BUFFER is a second image memory relative to fig. 1:FRAME MEMORY).

11. Claims 6 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sezan et al. (US Patent 5,682,205) in view of Ma (US Patent 7,072,398 B2) and Szeliski et al. (US Patent 5,611,000) and Eng et al. (Motion Trajectory Extraction Based on Macroblock Motion Vectors for Video Indexing) and Iu (US Patent 5,361,105), as applied to claims 1,2,7,8 and 11 above, further in view of Edwards et al. (US Patent 4,851,900).

Regarding claim 6, the combination does not teach the conventional in the conventional microscope.

Edwards teaches the "conventional microscope" in col. 5, lines 25-28.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Szeliski's microscope with Edwards conventional microscope, because Edwards conventional microscope can be used to teach in a learning environment. The determination of obviousness is predicated upon the following findings: One skilled in the art would have been motivated to modify Szeliski in this

manner because/in order to learn about nature in a school environment. Furthermore, the prior art collectively includes each element claimed (though not all in the same reference), and one of ordinary skill in the art could have combined the elements in the manner explained above using known engineering design, interface and/or programming techniques, without changing a "fundamental" operating principle of Szeliski, while the teaching of Edwards continues to perform the same function as originally taught prior to being combined, in order to produce the repeatable and predictable result of teaching in a learning environment. It is for at least the aforementioned reasons that the examiner has reached a conclusion of obviousness with respect to the claim in question.

Claim 10 is rejected the same as claim 6. Thus, argument presented in claim 6 is equally applicable to claim 10.

Allowable Subject Matter

12. Claim 9 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Claim 9 is allowable because the prior art does not store with a first memory a created image by correlating microscope image data from a second memory with microscope trajectory data from a third memory.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Shah et al. (Generation and Segmentation of Motion Trajectories) is pertinent as teaching that optical flow is a displacement vector field and flow vectors from successive frames are linked to create a trajectory in page 74, section 2, 1st paragraph, 2nd sentence. Note that Shah teaches away from tracking small objects.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DENNIS ROSARIO whose telephone number is (571)272-7397. The examiner can normally be reached on 9-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella can be reached on (571)272-7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Dennis Rosario

Examiner
Art Unit 2624

/Brian P. Werner/
Primary Examiner, Art Unit 2624